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David Glossop

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Dear David,

RE – Griffith Solar Farm 16-473- Noxious Weed Survey

The purpose of this letter is to provide a report on the noxious weed survey conducted at the site of the Griffith Solar Farm Project. The Conditions of Consent for the Griffith Solar Farm, requires a noxious weeds survey to effectively manage weeds. The Conditions of Consent (Schedule 3, Section 15) outlined below, requires the applicant to keep the ground cover free of weeds, following any construction or upgrading of the site.

Following any construction or upgrading on site, the Applicant shall:

- a) restore the ground cover of the site as soon as practicable, using suitable species; and*
- b) maintain ground cover; and*
- c) keep this ground cover free of weeds.*

Methods

A noxious weed survey was undertaken by NGH Environmental on the 3rd of February 2017. The site was surveyed by car with the location and extent of noxious weeds recorded using a GPS. For the purpose of the report, all weeds, including non-noxious, which were considered an impedance to the operation of the solar farm were recorded as a high priority weed.

A summary of the condition of the site, including noxious weeds present is provided below. A Map documenting the extent of weeds and recommendations for the management of the weeds is provided as an Appendix 1.1.1A.1A.1 to this report.

Condition of the Site

The project site includes highly disturbed paddock areas under cultivation and weed infested tracks and canal verges. The site is highly disturbed with the majority of vegetation cover consisting of weeds and residual crop species. A list of the weeds identified can be seen as an appendix to this document.

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There are two paddocks which were assessed individually during the survey. Both of the paddocks surveyed varied in percentage ground cover based on current site activities. The larger paddock (Figure 1) had been ploughed incorporating any ground cover with the top soil. The other smaller paddock (Figure 2) was dominated by weeds including Cathead (*Tribulus terrestris*), Bathurst

Burr (*Xanthium spinosum*) and Common Heliotrope (*Heliotropium europaeum*). The majority of the weeds that occur on site were along the boundary of the paddocks and adjacent the irrigation channels. However if the paddocks were not ploughed weeds would quickly colonise and dominate the ground cover. Ground cover observed along the irrigation channel was dominated by Fennel (*Foeniculum vulgare*), Cathead and Flaxleaf Fleabane (*Conyza spp*), with less common species, Horehound (*Marrubium vulgare*), Camel Melon (*Citrullus lanatus*), Silverleaf Night Shade (*Solanum elaeagnifolium*) and Spear Thistle (*Cirsium vulgare*).



Figure 1 Existing ground cover adjacent to the larger paddock looking west along Ross Lane.



Figure 2 Existing ground cover in the adjacent to the smaller paddock, looking west along Poletta Rd.

High Priority Weeds

Noxious weeds

Under the NSW *Noxious Weeds Act 1993* landholders are required by law to control noxious weeds on their property. The noxious weeds identified for Griffith are all listed as class 4 noxious weeds (Locally Controlled Weed). Class 4 noxious weeds

are plants that pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area.

The requirement for class 4 noxious weeds includes:

Class 4- Locally Controlled Weed.

The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.

The noxious weed species identified as occurring within the Project site include:

- Silver-leaf Nightshade (*Solanum Elaeagnifolium*, Class 4 Noxious weed)
- Artichoke Thistle (*Cynara cardunculus*, Class 4 Noxious weed)

There are numerous isolated patches of Silver-leaf Nightshade (*Solanum Elaeagnifolium*) and Artichoke Thistle (*Cynara cardunculus*) throughout the property (see attached weed map for general locations). These weeds are declared class 4 noxious weeds in the Griffith City Council LGA (*Noxious Weeds Act 1993*). They are also listed as Weeds of National Significance under the National Weeds Strategy (Appendix A.2).



Figure 3 Silver-leaf Nightshade within the project area.

Three other weeds were considered a high priority based on their potential to impede the land management of the solar farm and include;

- Bathurst Burr (*Xanthium spinosum*)
- Cathead (*Tribulus terrestris*)
- Spear Thistle (*Cirsium vulgare*).

Bathurst Burr, Cathead and Spear thistle were observed in areas adjacent to the irrigation channels (Appendix A.1). Although these species are not declared as noxious weeds in the Griffith City Council LGA they are considered a serious weed problem for crops and pastures in NSW. These weeds have been identified as a threat to the management of the Griffith Solar Farm due to their unpalatability to stock, increased fire hazard during seed set and ability to hinder accessibility to the solar arrays. Recommendations for the management of this weed is provided in the summary table as an Appendix A.2.

Recommendations

Management of high priority weeds should occur prior to construction and during operation of the solar arrays. A summary table is provided in Appendix A.2 which details the level of priority, images of the site and suggested methods for control. The following recommendations are made:

- Noxious and high priority weeds recorded on site should be managed in accordance with the recommended measures in Appendix A.2. Should mechanical removal be selected, the weeds and associated soil seed bank should be carefully stripped and removed from site.
- Ongoing weed management strategies for weeds identified in this report should be implemented for the operation of the Griffith Solar Farm.
- Annual weed monitoring is recommended to occur during spring/summer to identify weed spread throughout the project site.
- Additional advice and assistance should be sought from a local agronomist on the initial and ongoing control of weeds occurring on site.

It is important to note that the Biosecurity Act 2015 will repeal the Noxious Weeds Act 1993, and is due to commence in 2017. The Griffith City Council will continue to be responsible under the new legislation for ensuring the control of noxious weeds on private land by owners and occupiers.

Should you have any questions or wish to discuss further, please don't hesitate to contact me on the details below.

Yours sincerely,



Bryson Lashbrook
Environmental Consultant

Ph 02 6923 1536

NGH Environmental

ATTACHMENTS

A.1 GRIFFITH SOLAR FARM WEED MAP



- | | | |
|------------------------|-------------------|------------------------|
| Proposal site boundary | Camel Melon | Horehound |
| Substation | Cathead | Silver-leaf Nightshade |
| Artichoke Thistle | Fennel | Spear Thistle |
| Bathurst Burr | Flaxleaf Fleabane | |
| Blackberry Nightshade | Heliotrope | |

0 50 100 200 Metres

Ref: Griffith weed survey
 Author: B.lashbrook



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A.2 SUMMARY AND RECOMMENDATION TABLE

Identified	Scientific name	Site photo	Legal status weed	Priority for management	Recommendations	Herbicide options
Bathurst Burr	<i>Xanthium spinosum</i>		Class 4 noxious weed	high	Chipping -Chipping or hand hoeing is economical for small areas, individual plants or isolated populations. Due to the isolated populations of Bathurst Burr in the Griffith property, hand removal is recommended, however, after controlling burr plants it is important to monitor these sites for further germination events. Ongoing control of this weed will be required over the life of the solar farm.	<p>Fluroxypyr 200 g/L (Starane™) Rate: 75 mL per 100 L of water Comments: Apply to actively growing plants. Withholding period: 7 days. Herbicide group: I, Disruptors of plant cell growth (synthetic auxins) Resistance risk: Moderate</p> <p>2,4-D amine 625 g/L (Amicide® 625) Rate: 80–110 mL per 150 L water Comments: Spot spray. Seedlings only, actively growing. Withholding period: 7 days. Herbicide group: I, Disruptors of plant cell growth (synthetic auxins) Resistance risk: Moderate</p>
Blackberry Nightshade	<i>Solanum nigrum</i>			low	no initial management required	
Camel Melon	<i>Citrullus lanatus</i>			low	no initial management required	

Spear Thistle	<i>Cirsium vulgare</i>				Slashing/chemical application The optimum time for slashing or cutting usually occurs around October to November followed by spraying of rosettes.	MCPA 500 g/L (Various products) Rate: 100–200 mL in 150 L water Comments: Spot spray. Withholding period: 7 days. Herbicide group: I, Disruptors of plant cell growth (synthetic auxins) Resistance risk: Moderate . 2,4-D 300 g/L + Picloram 75 g/L (Tordon® 75-
						D) Rate: 300 mL/ha Comments: Boom spray application for young rosette or seedling plants. Withholding period: 1-8 weeks (see label). Herbicide group: I, Disruptors of plant cell growth (synthetic auxins) Resistance risk: Moderate
Fennel	<i>Foeniculum vulgare</i>			low	no initial management required	

Cathead	<i>Tribulus terrestris</i>				Chemical application -cathead seedlings are readily controlled by registered herbicides. Spot spraying small infestations of seedlings will prevent new colonies from establishing. Good herbicide coverage is essential for effective control. Spraying colonies is most successful when plants are fresh after rainfall. Spray in summer on emergence.	MCPA 500 g/L (Various products) Rate: 100–200 mL in 150 L water Comments: Spot spray. Withholding period: 7 days. Herbicide group: I, Disruptors of plant cell growth (synthetic auxins) Resistance risk: Moderate 2,4-D 300 g/L + Picloram 75 g/L (Tordon® 75D) Rate: 300 mL/ha Comments: Boom spray application for seedling plants. Withholding period: 1-8 weeks (see label). Herbicide group: I, Disruptors of plant cell growth (synthetic auxins) Resistance risk: Moderate
Horehound	<i>Marrubium vulgare</i>			low	no initial management required	
Artichoke thistle	<i>Cynara cardunculus</i>		Class 5 noxious weed	high	Chipping -Chipping or hand hoeing is economical for small areas, individual plants or isolated populations. Due to the isolated populations of Artichoke Thistle in the Griffith property, hand removal is	Picloram + 2,4-D amine (Group I) Active ingredient 750g/L picloram + 300g/L 2,4-D amine Rate: 15-25mL / 10L Time of application September-November before running-up to flower

					recommended, however, after controlling plants it is important to monitor these sites for further germination events. Ongoing control of this weed will be required over the life of the solar farm.	Comments: Residual effects of picloram will persist for one to two seasons affecting legumes but not grasses. Use the 25mL rate at flowering. Individual plants may be grubbed: remove crown otherwise regrowth will occur. The herbicide 2,4-D amine: both 500 and 625g/L formulations, are effective on this weed.
common heliotrope	<i>Heliotropium europaeum</i>			low	no initial management required	
Fleabane	<i>Conyza bonariensis</i>			low	no initial management required	
Silver-leaf nightshade	<i>Solanum Elaeagnifolium</i>		Class 4 noxious weed	High	Chemical application -Silverleaf nightshade seedlings are readily controlled by all registered herbicides. Spot spraying small infestations of seedlings is important to prevent new silverleaf nightshade colonies from establishing. Good herbicide coverage is essential for effective control. Spraying colonies is most successful when plants are fresh after rainfall. If the plant is stressed or dormant the herbicides will have little or no effect.	2,4-D 300 g/L + Picloram 75 g/L (Tordon® 75D) Rate: 650 mL in 100 L of water Comments: Spot spray. Spray to wet thoroughly. Extend treated areas beyond the last plant for 1 m. Withholding period: 1-8 weeks (see label). Herbicide group: I, Disruptors of plant cell growth (synthetic auxins) Resistance risk: Moderate Glyphosate 360 g/L (Roundup®) Rate: 2.0 L in 100 L of water Comments: Apply at early flowering to berry set stage, spray thoroughly to wet. Use only with good soil moisture conditions. Withholding period: Nil. Herbicide group: M, Inhibitors of EPSP synthase Resistance risk: Moderate

